

1 **GOLF CLUB HEAD AND METHOD FOR MANUFACTURING THE**
2 **GOLF CLUB HEAD**

3 BACKGROUND OF THE INVENTION

4 1. Field of the Invention

5 The present invention relates to a golf club head, and more particularly
6 to a golf club head made of composite materials and a manufacturing method for
7 the golf club head.

8 2. Description of Related Art

9 Conventional golf club heads generally have two types of structure and
10 manufacturing methods. The first type of golf club head is made of metal and is
11 integrally formed by casting, or is composed of multiple forged members welded
12 together. The other type of golf club head is made of composite materials and is
13 composed of a molded body including a faceplate, a shank and a sole plate and a
14 fiber crown attached to the body.

15 However, the metal golf club head fabricated by means of casting or
16 forging has some shortcomings, such as being time-consuming to manufacture,
17 difficult to position the center of gravity, and having a small size.

18 With reference to Fig. 6, a conventional composite golf club head has a
19 hollow body (6) and a cover (63). The hollow body (6) is made of metal and is
20 composed of a strike plate (60), a shank (61) and a sole (62). The strike plate (60)
21 has a sweet spot (not shown) covering a specific area, and the sole (62) is
22 enlarged to increase the area covered by the sweet spot. However, increasing the
23 sweet spot significantly may cause the weight of the golf club head to exceed
24 allowable golf club head standards.

1 The cover (63) is made of a fiber prepreg (pre-impregnated) material
2 bonded directly to the strike plate (60) and will repeatedly be subjected to a great
3 impact force from the strike plate (60). After a period of such treatment, cracks
4 may develop in the golf head at the joint between the cover (63) and the strike
5 plate (60). Therefore, multiple reinforcing layers and strips must be fabricated
6 inside and outside the golf club head to protect weak spots, so manufacturing the
7 golf club head is very inconvenient.

8 Therefore, the invention provides a composite golf club head to mitigate
9 or obviate the aforementioned problems.

10 SUMMARY OF THE INVENTION

11 The main objective of the present invention is to provide a composite
12 golf club head that can absorb a strike force on a strike plate, has an enlarged
13 sweet spot on the strike plate and is easy to manufacture.

14 Another objective of the present invention is to provide a method to
15 manufacture the composite golf club head as described above.

16 Other objectives, advantages and novel features of the invention will
17 become more apparent from the following detailed description when taken in
18 conjunction with the accompanying drawings.

19 BRIEF DESCRIPTION OF THE DRAWINGS

20 Fig. 1 is an exploded perspective view of a golf club head in accordance
21 with the invention;

22 Fig. 2 is a block diagram of a manufacturing process for the golf club
23 head in accordance with the invention;

24 Fig. 3 is a cross sectional side plan view of the golf club head in Fig. 1;

1 Fig. 4 is a cross sectional side plan view of the golf club head in Fig. 1
2 positioned in a hot-press mold;

3 Fig. 5 is an operational cross sectional side plan view of the golf club
4 head in Fig. 4; and

5 Fig. 6 is a perspective view of a conventional composite golf club head.

6 DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

7 With reference to Fig. 1, a golf club head in accordance with the present
8 invention is composed of a strike plate (10), a body (20), a sole plate (30) and a
9 balance weight (33).

10 The strike plate (10) is made up of a light-weight alloy, has a front (not
11 numbered), a rear (not numbered), a heel (not numbered), a toe (not numbered),
12 a shank (11) and a rim (12). The shank (11) is formed at the heel of the strike
13 plate (10), and the rim (12) is formed around the rear of the strike plate (10) to
14 form a hollow cup-like body (not numbered).

15 The body (20) is bonded to the rim (12) and is composed of a crown (21)
16 and a sole (22) bonded together. The crown (21) and the sole (22) are made of
17 multiple layers of fiber prepreg (pre-impregnated) material such as carbon fiber,
18 glass fiber, Kevlar™ fiber, boron fiber, titanium fiber, copper fiber, aluminum
19 fiber, etc. impregnated with resin previously. The sole (22) has an opening (23).

20 The sole plate (30) is metal, is mounted in the opening (23) and has a
21 seat (31). A hole (32) is defined through the seat (31).

22 The balance weight (33) is mounted in the hole (32).

23 With reference to Figs. 2-5, a process to manufacture the golf club head
24 includes the steps of preparing the individual elements (A), pressing prepreg

1 materials (B), assembling the golf club head (C), shaping the golf club head (D),
2 curing the prepreg materials (E), removing the golf club head from the die (50)
3 (F) and finishing the golf club head (G).

4 Preparing the individual elements (A) comprises casting or forging the
5 strike plate (10) with the shank (11), the sole plate (30) and the balance weight
6 (33), cutting and bonding the prepreg material based on the profiles of the crown
7 (21) and the sole (22) and preparing adhesive sheets (34) and an air bladder (40).

8 Pressing prepreg material (B) comprises pressing the prepreg material
9 pieces in corresponding dies (not shown) to form the crown (21) and the sole
10 (22).

11 Assembling the golf club head (C) comprises attaching the strike plate
12 (10), the crown (21), the sole (22) and the sole plate (30) to each other by the
13 adhesive sheets (34) to form the golf head with an inner cavity (not numbered),
14 and inserting the air bladder (40) into the cavity through the hole (32) in the golf
15 head with a nozzle (not numbered) that extends out of the hole (32).

16 Shaping the golf club head (D) comprises pumping air into the air
17 bladder (40) to pre-shape the golf club head.

18 Curing the prepreg materials (E) comprises heating, pressing and
19 blowing the pre-shaped golf club head in a hot-press molding die (50) to cure the
20 prepreg materials of the body (20). The adhesive sheets (34) are pressed by the
21 air bladder (40) to tightly abut the inside wall of the golf head.

22 Removing the golf club head from the die (50) (F) comprises removing
23 the cured golf club head from the hot-press molding die (50), and the air bladder
24 (40) from the cavity in the golf club head through the hole (32).

1 Finishing the golf club head (G) comprises finishing the golf club head,
2 installing the balance weight (33) in the hole (32) in the sole plate (30) and
3 painting the golf club head.

4 The invention has the following advantages.

5 1. The strike plate (10) has a rim (12) to absorb the impact force, so only
6 a small force is transmitted to the body (20) made of the fiber prepreg material,
7 and a user can easily handle the golf club head.

8 2. Because the strike plate (10) is made of a light-weight alloy and is
9 separated from the sole plate (30), an area of the strike plate (10) can be
10 increased moderately to enlarge the sweet spot without increasing the sole plate
11 (30), and the golf club head weight can be kept under the standard weight.

12 3. Manufacturing the body (20) of the fiber prepreg material by means of
13 the automatic pressing procedure is very easy.

14 4. Balancing the center of gravity by installing a balance weight (33) in
15 the golf club head is simple.

16 Even though numerous characteristics and advantages of the present
17 invention have been set forth in the foregoing description, together with details
18 of the structure and function of the invention, the disclosure is illustrative only,
19 and changes may be made in detail, especially in matters of shape, size, and
20 arrangement of parts within the principles of the invention to the full extent
21 indicated by the broad general meaning of the terms in which the appended
22 claims are expressed.